

Nutritional Status and Nutrition Support in Breast Cancer Patients

Eurasian Clinical and Analytical Medicine Original Research

Breast Cancer and Nutrition

Eyüp Murat Yılmaz¹, Berke Manoğlu², Aykut Soyder¹, Erkan Karacan¹, Şükrü Boylu¹

¹Department of General Surgery, Faculty of Medicine, Adnan Menderes University

²General Surgery Clinic, Aydın Government Hospital, Aydın, Turkey

This study was published as a poster for the 20th National Surgery Congress.

Abstract

Aim: Nowadays, the risk of malnutrition which may develop after planning the treatment of overweight and obese female patients who were diagnosed with breast cancer, one most common cancer among women, is not considered. In this paper, we aimed to assess the nutrition status and importance for nutritional supplement in breast cancer patients in the preoperative period.

Material and Methods: Of the 74 volunteers participating in the study, all were newly diagnosed breast cancer patients. The patients who previously received neoadjuvant therapy or underwent tumor surgery or those with other cancers were excluded from the study. The patients were applied to the MNA-SF test and their body mass indexes (BMI), types and stages of cancer were recorded.

Result: The mean MNA-SF scores of the patients was calculated as 11.93. It was observed that histopathological stage of cancer diagnosis of the patients increases with age, but the MNA-SF scores decreases ($p = 0.866$). There was no statistical significance between histopathological stage and body mass index (BMI). MNA-SF values were low in patients losing weight ($p = 0.001$).

Discussion: At diagnosis, whether enteral nutrition support is required for breast cancer patients can be determined via nutritional screening. While providing enteral nutrition support, performing a close nutritional screening to these patients may be beneficial by considering the negative effects of excessive weight gain during adjuvant treatment on survival.

Keywords

Breast Cancer; Nutrition; Malnutrition

DOI:10.4328/ECAM.90

Received : 05.05.2016

Accepted : 29.05.2016

Published Online : 01.09.2016

Printed Online : 01.09.2016

Eu Clin Anal Med 2016;4(3): 74-6

Corresponding Author: Eyüp Murat Yılmaz, Adnan Menderes Üniversitesi, Aydın, Türkiye.

GSM: +90 505 600 59 95 - **E-Mail:** drmyilmaz80@gmail.com

How to cite this article: Eyüp Murat Yılmaz, Berke Manoğlu, Aykut Soyder, Erkan Karacan, Şükrü Boylu. Nutritional Status and Nutrition Support in Breast Cancer Patients. Eu Clin Anal Med 2016;4(3): 74-6

Introduction

Despite the advances in screening methods, breast cancer has become widespread all around the world and has been the most common type of cancer among women [1]. However, with the screening procedures and early diagnoses, the patients' survivability and quality of life are quite well. Compared to past ten years, we mostly encounter early stage breast cancer rather than metastatic or locally-advanced breast cancers in patients admitted to the general surgery clinics [2]. There are several well-known major risk factors for breast cancer. Having a high body mass index is one of them [3]. Generally, the patients who were diagnosed with breast cancer are overweight or obese and the risk for malnutrition which may develop after adjuvant treatment is not considered. However, particularly gastrointestinal tract, head and neck cancer patients, and those with other system cancer are often at risk of malnutrition and their immune systems are weak and susceptible to infection at diagnosis [4]. Therefore, these patients generally undergo nutritional status screening and nutritional support is provided prior to operations or adjuvant therapy. Breast cancer patients may not bear risk at diagnosis but they may prone to develop complications that the other cancer patients experience during post-operative period and adjuvant treatment. Therefore, once the patient is diagnosed with cancer, nutritional status should be assessed and appropriate nutrition therapy should be initiated without any delay. As well as various measurements, reliable and proven surveys for the assessment of nutrition status are also available.

In this study, we aimed to assess the nutrition status of breast cancer patients at diagnosis in the preoperative period via a proven mini nutritional assessment short form (MNA-SF) test which consists of 20 questions. We aimed to have an idea about the nutritional status in breast cancer patients.

Material and Methods

Participants

After obtaining approval of local ethics committee, this study was conducted at Adnan Menderes University, Faculty of Medicine, Department of General Surgery between September 2014 and September 2015. A total of 74 volunteer patients who were newly diagnosed with breast cancer were included in the study. The patients who previously received neoadjuvant therapy or underwent tumor surgery or those with other cancers were excluded from the study.

Assessments

The patients were applied to the MNA-SF test and their body mass indexes (BMI), types and stages of cancer were recorded.

MNA-SF (Mini Nutritional Assessment Short Form)

As well as anthropometric measurements, more practical and proven questionnaires such as Nutritional Risk Screening (NRS), Nutrition Risk Index (NRI), Malnutrition Universal Screening Tool (MUST), MNA (Mini Nutritional Assessment), and MNA-SF (Mini Nutritional Assessment Short Form) to assess the nutritional status of the patients are also available. While some of these tests evaluate nutritional status, some show the response to nutritional diet or some are used to predict the outcomes [5]. MNA-SF is a test used to evaluate nutritional status particularly giving better results in elderly patients [6]. It can be applied in both clinical practice and general surgery and oncology outpatient clinics. We chose this test because it is easy to use and reliable. It consists of a total of 6 questions. A score of 12-14 is considered as normal, 8-11 points at risk of malnutrition and 0-7 points malnutrition. These results are interpreted and nutritional therapy is planned.

Statistical Analysis

For statistical analysis, SPSS software, version 15 (SPSS, Chicago, IL) was used. Kolmogorov-Smirnov test was applied to test the distribution of

continuous variables. Continuous variables were expressed as mean \pm SD or median and 25th to 75th percentile values as appropriate. Categorical variables were expressed as percentages. One-way analysis of variance with post hoc Scheffe correction was used to test statistical differences among groups. For the analysis of parametric or nonparametric variables, Kruskal-Wallis test was used.

Results

The mean age of the patients was 55.54 (\pm 11.73). Of the patients with breast cancer, while 63 (85.2%) were diagnosed with invasive ductal carcinoma, 11 (14.8%) received other histopathological diagnoses (invasive lobular carcinoma, paget, colloid carcinoma, etc.). Sixty patients (81%) underwent breast-conserving surgery + sentinel lymph node biopsy and the remaining 14 (19%) underwent modified radical mastectomy. The mean BMI of the patients was 29.64 (\pm 6.87). While twenty-two patients (29.7%) had weight loss before the diagnosis, the remaining 52 patients (73.3%) did not experience weight loss. The mean MNA-SF scores of the patients was 11.93. Three patients (4%) were malnourished, 26 patients (35.1%) were at risk of malnutrition and 45 patients (61.9%) had normal nutritional value. It was observed that as the histopathological stage of the cancer diagnosis of the patient increases, the age of the patients increases too, but the MNA-SF score decrease ($p = 0.866$) (Table 1). No statistically significant association was observed between BMI and histopathological stages. While MNA-SF scores were lower in those patients presenting with weight loss ($p = 0.001$), their age was found to be lower ($p = 0.153$) (Table 2). It was determined that as the age increases, MNA-SF scores decrease ($p = 0.488$) (Table 3).

Table 1. The relationship between age, BMI, MNA-SF and tumor stage

Stage (n)	Age	BMI	MNASF
1a (35)	53.60 \pm 12.73	29.05 \pm 7.21	12.46 \pm 2.32
2a (20)	56.45 \pm 10.19	31.15 \pm 6.98	11.25 \pm 2.15
2b (13)	56.62 \pm 12.11	28.46 \pm 3.69	11.54 \pm 2.44
3a (3)	60.00 \pm 11.27	24.33 \pm 4.04	11.66 \pm 3.21
3b (2)	67.50 \pm 6.36	33.00 \pm 12.73	11.50 \pm 3.53
3c (1)	54.00	44.00	14.00
P= 0.866			

Table 2. The relationship between weight loss, age and MNASF

Weight loss	MNASF	Age
Yes (22)	9.64 \pm 2.32	54.27 \pm 12.37
No (52)	12.90 \pm 1.55	58.54 \pm 9.65
P= 0.001		

Table 3. Change of MNASF with the age

MNASF	(n)	Age
Malnutre (0-7)	(3)	63.67 \pm 4.93
Risk of malnutrition (8-11)	(26)	56.77 \pm 11.59
Normal (12-14)	(45)	54.29 \pm 12.00
P=0,488		

Discussion

Having a high body mass index is the leading acquired risk factor for breast cancer [3]. For this reason, rather than being cachectic, breast cancer patients are generally overweight or obese at diagnosis. However, according to the classification of Fearon et al. [7], as in all cancers,

breast cancer has three stages as precachexia, cachexia and refractory cachexia. According to this classification, once the diagnosis of cancer is established, nutritional status should be evaluated immediately; the patient should be captured in precachexic term and enteral nutrition support should be provided without exposing unnecessary and tedious complications of malnutrition.

High (40-80%) ratio of patients receiving chemotherapy is at risk of malnutrition based on the type, location and stage of cancer and treatment strategies [8]. Sanchez et al's study [8] revealed that 31.9% of breast cancer patients experience gastrointestinal symptoms and nutritional disturbance during adjuvant treatment. It was also reported in this study that patients have weight loss at different rates depending on localization and stage of the cancer. In our study, we observed that the age of patients increases with the stage of cancer but MNA-SF values show decreases. ($p = 0.488$) However, no statistically significant difference was observed. Immune system weakens with age [9]. We also observed that elderly people had worse prognosis age. Above-mention findings are an indicator for increased susceptibility to malnutrition.

While studies related to weight gain and obesity in breast cancer patients are numerous, studies on malnutrition are very limited. Similarly, malnutrition studies in head and neck and gastrointestinal cancer are numerous but those investigating the relationship between malnutrition and breast cancer are very scarce. In their study, Fakude et al. [10] determined that 19% of stomach cancer patients were malnourished and they should necessarily be provided preoperative enteral nutrition support. In our study, 4% of severely malnourished patients, 35.1% were at risk of malnutrition. This ratio is substantial in breast cancer patients [11]. In their study, Atalay et al. [11] reported that weight gain over 3 kilograms during adjuvant treatment may adversely affect survival in breast cancer patients. On the contrary, they argued that high body mass index (BMI) at diagnosis have no negative impact on survival. In their study, 43.2 of the patients gain weight over 3 kilograms. In our study, 39.1% of the patients were malnourished or at the risk of malnutrition. Therefore, these patients should be kept under close nutrition screening not only in preoperative period but also in postoperative and adjuvant therapy periods in oncology clinics. In addition, we also observed that the patients with weight loss prior to diagnosis had significantly lower MNA-SF scores which indicate that MNA-SF test may be performed safely. The studies show that malnourished instant diagnosis of breast cancer patients is very limited in literature. Shirilina et al [12] in their study a variety of dietary factors have been implicated. Also high body mass index is seen as a risk factor. Therefore, we aimed to investigate the malnutrition.

Weight loss in breast cancer is not due to malnutrition arising from mechanical reasons or dyspepsia as in gastrointestinal tract or head and neck cancers but the aggressive biology of the tumors and subsequently released cytokines [13-15]. In order to break the catastrophic cascade of the tumor, nutrition scanning should be performed and appropriate enteral nutrition support should be initiated. However, while providing enteral nutrition support, nutrition screening should be performed frequently and closely. Because excessive weight gains during adjuvant treatment may negatively affect the prognosis [16, 17]. After gaining weight, fat ratio in the body increases, body fat is stored and converts into estrogen and consequently increases the amount of free estrogen which may lead to local recurrence, breast cancer formation in the other breast or distant metastases [18]. Therefore, close and frequent nutrition screening is needed while providing enteral support therapy.

Limitations

The primary limitation of our study is the relatively limited number of patients participating in the study. In addition, MNA-SF evaluation, BMI

and weight measurements were only performed at diagnosis prior the operation not after adjuvant treatment.

In conclusion, as in all other cancers, breast cancer should be closely monitored for malnutrition, and nutritional screening should be performed at diagnosis and those who are at risk of malnutrition should be immediately provided with enteral nutrition support to avoid complication of malnutrition. MNA-SF is a reliable test for nutritional screening. However, while providing enteral support, the patients may undergo close nutrition screening by considering the negative effects of excessive weight gain which may develop during adjuvant treatment on survival.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

Funding: None

Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

References

- Clarke M, Collins R, Darby S, Davies C, Elphinstone P, Evans E, et al. Effects of radiotherapy and of differences in the extent of surgery for early breast cancer on local recurrence and 15-year survival: an overview of the randomised trials. *Lancet Oncol* 2005;366:2087-3106.
- Kumar NB, Cantor A, Allen K, Cox CE. Android obesity at diagnosis and breast carcinoma survival. *Cancer* 2000;88:2751-7.
- Rock CL, Demark-Wahnefried W. Nutrition and survival after the diagnosis of breast cancer: a review of the evidence. *J Clin Oncol* 2002;20:3302-16.
- Wu BW, Yin T, Cao WX, Gu ZD, Wang XJ, Yan M, et al. Clinical application of subjective global assessment in Chinese patients with gastrointestinal cancer. *World J Gastroenterol* 2009;15(28):3542-9.
- Asiimwe SB. Simplifications of the mini nutritional assessment short-form are predictive of mortality among hospitalized young and middle-aged adults. *Nutrition* 2016;32(1):95-100.
- Rubenstein LZ, Harker JO, Salva A, Guigoz Y, Vellas B. Screening for undernutrition in geriatric practice: developing the shortform mini-nutritional assessment (MNA-SF). *Gerontol A Biol Sci Med Sci* 2001;56:366-72.
- Fearon K, Strasser F, Anker SD, Bosaeus I, Bruera E, Fainsinger RL et al. Definition and classification of cancer cachexia: an international consensus. *Lancet Oncol* 2011;12(5):489-95.
- Sánchez-Lara K, Ugalde-Morales E, Motola-Kuba D, Green D. Gastrointestinal symptoms and weight loss in cancer patients receiving chemotherapy. *Br J Nutr* 2013;109(5):894-7.
- Wage J, Ma L, Peluso M, Lamont C, Evens AM, Hahnfeldt P, et al. Proton irradiation impacts age-driven modulations of cancer progression influenced by immune system transcriptome modifications from splenic tissue. *J Radiat Res* 2015;56(5):792-803.
- Fukuda Y, Yamamoto K, Hirao M, Nishikawa K, Maeda S, Haraguchi N et al. Prevalence of Malnutrition Among Gastric Cancer Patients Undergoing Gastrectomy and Optimal Preoperative Nutritional Support for Preventing Surgical Site Infections. *Ann Surg Oncol* 2015;22(Suppl 3):S778-85.
- Atalay C, Küçük Aİ. Meme kanserinde adjuvan kemoterapi sırasında kilo artışının sağkalıma etkisi. *Ulus Cerrahi Derg* 2015;31:124-7.
- Shirilina NG, Vilms EA, Stasenka VL. Nutrition as a possible risk factor for breast cancer. *Gig Sanit* 2015;94(8):48-52.
- Volek JS, Phinney SD, Forsythe CE, Quann EE, Wood RJ, Puglisi MJ, et al. Carbohydrate restriction has a more favorable impact on the metabolic syndrome than a low fat diet. *Lipids* 2009;44:297-309.
- Forsythe CE, Phinney SD, Fernandez ML, Quann EE, Wood RJ, Bibus DM, et al. Comparison of low fat and low carbohydrate diets on circulating fatty acid composition and markers of inflammation. *Lipids* 2008;43:65-77.
- McTiernan A, Irwin M, VonGruenigen V. Weight, physical activity, diet, and prognosis in breast and gynecologic cancers. *J Clin Oncol* 2010;28:4074-80.
- Siitri PK. Adipose tissue as a source of hormones. *Am J Clin Nutr* 1987;45(Suppl 1):277-82.
- Bradshaw PT, Ibrahim JG, Stevens J, Cleveland R, Abrahamson PE, Satia JA, et al. Post-diagnosis change in bodyweight and survival after breast cancer diagnosis. *Epidemiology* 2012;23:320-7.
- Turner BC, Haffty BG, Narayanan L, Yuan J, Havre PA, Gumbs AA, et al. Insulin-like growth factor-1 receptor overexpression mediates cellular radioresistance and local breast cancer recurrence after lumpectomy and radiation. *Cancer Res* 1997;57:3079-83.